

What Is Claimed Is:

1. An isolated and purified DNA molecule encoding atrazine chlorohydrolase; the DNA molecule hybridizes to DNA complementary to DNA having the sequence shown in Figure 6 (SEQ ID NO:1), beginning at position 236 and ending at position 1655, under the stringency conditions of hybridization in buffer containing 0.25 M

5 Na<sub>2</sub>HPO<sub>4</sub>, 7% SDS, 1% BSA, 1.0 mM EDTA at 65°C, followed by washing with 0.1% SDS and 0.1x SSC at 65°C.

10 2. The isolated and purified DNA molecule of claim 1 encoding the atrazine chlorohydrolase having an amino acid sequence shown in Figure 7 (SEQ ID NO:2).

15 3. The isolated and purified DNA molecule of claim 1 having the nucleotide sequence shown in Figure 6 (SEQ ID NO:1) beginning at position 236 and ending at position 1655.

4. The isolated and purified DNA molecule of claim 1 having the nucleotide sequence shown in Figure 6 (SEQ. ID NO:1).

20 5. An isolated and purified protein having a molecular weight of about 245 kilodaltons that converts atrazine to hydroxyatrazine.

6. The isolated and purified protein of claim 5 which is a homotetramer.

25 7. The isolated and purified protein of claim 5 which has the amino acid sequence shown in Figure 7 (SEQ. ID NO:2).

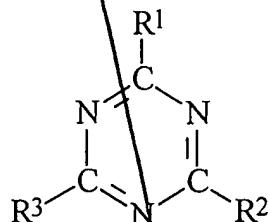
8. The isolated and purified protein of claim 7 bound to an immobilization support.

*Reb C3*

9. An isolated and purified protein encoded by the DNA molecule of claim 1.
10. An isolated and purified protein encoded by the DNA molecule of claim 3.
- 5 11. A polyclonal antibody preparation produced from the isolated and purified protein of claim 5.
12. A polyclonal antibody preparation produced from the isolated and purified protein of claim 7.
- 10 13. A vector comprising the DNA molecule of claim 1.
14. The vector of claim 13 wherein the DNA molecule of claim 1 is derived from a *Pseudomonas* strain.
- 15 15. A non-*Pseudomonas* bacterial cell comprising the vector of claim 14.
16. An isolated and purified oligonucleotide of about 7-300 nucleotides which hybridizes to DNA having the sequence shown in Figure 6 (SEQ ID NO:1), beginning at position 236 and ending at position 1655, under the stringency conditions of hybridization in buffer containing 0.25 M Na<sub>2</sub>HPO<sub>4</sub>, 7% SDS, 1% BSA, 1.0 mM EDTA at 65°C, followed by washing with 0.1% SDS and 0.1x SSC at 65°C.
- 25 17. A method for the purification of atrazine chlorohydrolase in at least about 90% yield consisting of a step of adding ammonium sulfate to an aqueous cell-free extract of an atrazine chlorohydrolase-containing bacterium.

18. The method of claim 17 wherein ammonium sulfate is added in an amount of no greater than about 20% of saturation.

19. A method for the degradation of compounds have the following general formula:



wherein  $\text{R}^1 = \text{Cl}$ ,  $\text{R}^2 = \text{NR}^4\text{R}^5$  (wherein  $\text{R}^4$  and  $\text{R}^5$  are each independently H or a  $\text{C}_{1-3}$  alkyl group), and  $\text{R}^3 = \text{NR}^6\text{R}^7$  (wherein  $\text{R}^6$  and  $\text{R}^7$  are each independently H or a  $\text{C}_{1-3}$  alkyl group), with the proviso that at least one of  $\text{R}^2$  or  $\text{R}^3$  is an alkylamino group;

15 said method comprising adding atrazine chlorohydrolase to a sample containing said compound.

20 20. The method of claim 19 wherein the sample is a soil sample.

21. The method of claim 20 wherein the soil sample is contaminated with a nitrogen-containing fertilizer.

22. The method of claim 19 wherein the step of adding atrazine chlorohydrolase comprises adding a recombinant bacterium that expresses atrazine chlorohydrolase.

25 23. The method of claim 19 wherein the step of adding atrazine chlorohydrolase comprises adding the bacterial cell of claim 15.

*Part C4*

24. An isolated and purified protein that converts atrazine to hydroxyatrazine, wherein the protein comprises an amino acid sequence encoded by a DNA molecule having a compliment that hybridizes to a DNA having the sequence shown in Figure 6 (SEQ ID NO:1), beginning at position 236 and ending at position 1655, under the stringency conditions of hybridization in buffer containing 0.25 M Na<sub>2</sub>HPO<sub>4</sub>, 7% SDS, 1% BSA, 1.0 mM EDTA at 65°C, followed by washing with 0.1% SDS and 0.1x SSC at 65°C.

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25. An isolated and purified protein and biologically active derivatives thereof that convert atrazine to hydroxyatrazine, wherein the protein comprises an amino acid sequence encoded by a DNA molecule having a compliment that hybridizes to a DNA having the sequence shown in Figure 6 (SEQ ID NO:1), beginning at position 236 and ending at position 1655, under the stringency conditions of hybridization in buffer containing 0.25 M Na<sub>2</sub>HPO<sub>4</sub>, 7% SDS, 1% BSA, 1.0 mM EDTA at 65°C, followed by washing with 0.1% SDS and 0.1x SSC at 65°C.

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26. An isolated and purified protein that converts atrazine to hydroxyatrazine, wherein the protein comprises an amino acid sequence having greater than about 80% sequence identity to the amino acid sequence depicted at SEQ ID NO:2.

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*Part C5*

27. An isolated and purified protein and biologically active derivatives thereof that convert atrazine to hydroxyatrazine, wherein the protein comprises an amino acid sequence having greater than about 80% sequence identity to the amino acid sequence depicted at SEQ ID NO:2.

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